DOI: 10.1002/mar.21338

RESEARCH ARTICLE

Psychology & Marketing WILEY

Interactive music for multisensory e-commerce: The moderating role of online consumer involvement in experiential value, cognitive value, and purchase intention

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Abstract

Background music adds a multisensory element to marketing and e-commerce. Applying interactive sensory-enabling technologies (SETs) to online shopping websites is an area of interest in sensory marketing. This research examines interactive background music in e-commerce and investigates how online consumer involvement moderates the effects of interactive music. Single-factor experiments with three conditions (interactive music, static background music, and control) were conducted to investigate its impact on experiential value, cognitive value, and purchase intention of high- and low-involvement consumers among both students (Study 1, $N = 251$) and nonstudent samples (Study 2, $N = 218$). Different music genres were applied to stimuli of the two studies to demonstrate the generalizability of the findings. Results find that interactive music enhances the experiential value of e-commerce for low-involvement consumers. By contrast, high-involvement consumers show greater purchase intention under the interactive music condition due to a heightened level of perceived cognitive value. Involvement is an effective predictor of elaboration and purchase intention under the interactive music condition, but not under the other two conditions. The contribution is twofold: (a) it shows the impact of music as an interactive SET and, (b) demonstrates the moderating role of consumer involvement in the context of multisensory integration in e-commerce. Theoretical and practical implications are discussed along with limitations and directions for future research.

KEYWORDS

e-commerce, interactive music, interactivity, multisensory integration, online consumer involvement, sensory marketing, sensory-enabling technologies (SETs)

1 | INTRODUCTION

In line with this special issue on the influence of sensory elements in marketing, the role that music plays in marketing and e-commerce is important for scholars and marketers alike. Music in e-commerce makes for a multi-modality platform via interactive technologies, specifically sensory-enabling technologies (SETs), which are powerful in creating online environments that generate positive consumer feedback (Petit, Velasco, & Spence, 2019; Rappaport, Richter, & Kennedy, 2018; Velasco, Obrist, Petit, & Spence, 2018). Therefore, there is a need to better understand how SETs can be applied to create more engaging and immersive online consumer experiences and how such experiences can impact purchase behavior (Petit et al., 2019; Shen, Zhang, & Krishna, 2016). However, despite a promising future for integration of the two fields, marketers do not have theory-based knowledge of SETs' affordance, and human–

computer interaction (HCI) researchers have not realized the potential of applying SETs to the digital retailing space (Velasco et al., 2018). As a result, there is a demonstrated need to bridge the gap between sensory marketing and HCI research (Spence & Velasco, 2018).

While the focus here is mainly in auditory and visual aspects of online shopping via background music, we do recognize work on other senses in e-commerce, and that they may interplay. Though visual imagery is a dominating element of e-tail store design, auditory (e.g., background music), on-screen gestures (e.g., actions of zooming, dragging, sliding), olfactory, and gustatory inputs could plausibly all contribute to the holistic experience of shopping online. Namely, literature has confirmed the positive effect of multisensory integration in online consumer behavior (Spence & Gallace, 2011; Streicher & Estes, 2016). Thus, it is recommended that sensory marketing strategies apply multi-modality stimuli to enhance consumer engagement during online shopping (Krishna, Cian, & Aydınoğlu, 2017; Spence, Puccinelli, Grewal, & Roggeveen, 2014). Therefore, the current studies investigate the combined effect of visual and audio SETs on online consumers' perceptual experience and behavioral intention. Specifically, we apply interactive music to examine how simultaneously interacting with sound effects and on-screen interactive features can influence consumers while they shop online.

Interactive music is defined as a category of audio media where user actions lead to change in differing aspects of music, such as tempo, mode, texture, and volume (Winkler, 2001). The media format draws the attention of the current research for two main reasons. First, while former studies in the fields of music therapy and video gaming have revealed positive effects of interactive music on user engagement and attention (Schwartz, Ayres, & Douglas, 2017), there has been little discussion on the impact of interactive music in the e-tail context. Furthermore, given that research demonstrates the positive impact of both interactive and musical stimuli on enhancing consumers' behavioral intention (e.g., Ding & Lin, 2012; Webster & Weir, 2005; Xu & Sundar, 2014), their joint presence may provide value to the user experience.

In fact, the role of sound effects has evolved with the unprecedented progression of sensory marketing research and application. Early marketing literature considered the use of music as a component of store atmosphere, evoking pleasant emotions that encourage purchase intention (Milliman, 1986; Turley & Milliman, 2000; Yalch & Spangenberg, 1990). However, recent studies revealed that the structural design of ambient music can likewise play a key role in consumers' cognition, such as critical evaluation toward brands and products (Ballouli & Bennett, 2014; Biswas, Lund, & Szocs, 2019; McDowell, Wilson, & Kile, 2016). Furthermore, when applying sound effects to digital storefronts, the technological affordance of an interface provides consumer control and further facilitates individuals' cognitive processing (Sundar, Jia, Waddell, & Huang, 2015; Xu & Sundar, 2014). Given that the role of musical stimuli has shifted from a heuristic cue to a determining factor in complex decision-making processes of e-consumers, there is a necessity to define target consumer groups for interactive background music.

Acquired the concept of involvement from social psychology, scholars have consistently applied the Elaboration Likelihood Model (Petty & Cacioppo, 1984) as a theoretical framework to explain the effectiveness of marketing communication under high- and low-involvement conditions. More specifically, various theories have addressed the linkages among consumer involvement and dimensions of marketing strategies, such as brand loyalty (e.g., Suh & Yi, 2006), customer satisfaction (e.g., Homburg & Giering, 2001; Olsen, 2007), perceived risk (e.g., Laroche, Bergeron, & Goutaland, 2003), and approach behavior (e.g., Ha & Lennon, 2010).

More recently in online contexts, involvement comes hand-in-hand with the blossom of digital engagement (Oh, Bellur, & Sundar, 2018; Scheinbaum, 2016; Tiago & Veríssimo, 2014). Resulting from cognition, affect, and motivation, digital engagement refers to online behavior which forms customer-brand and -product relationship (Scheinbaum, 2016; Tiago & Veríssimo, 2014). Digital engagement arises as a crucial attribute for the current study to take into concern (Calder, Malthouse, & Maslowska, 2016; Harmeling, Moffett, Arnold, & Carlson, 2017). Given the premise, scholars have re-emphasized the importance of consumer involvement in online retailing and marketing research, as it is an antecedent of engagement (Leckie, Nyadzayo, & Johnson, 2016).

Therefore, the purpose of the present research is to obtain insights regarding the use of SETs in e-commerce by investigating its effect on purchase intention of both low-involvement and high-involvement online consumers. The central research question is as follows:

RQ: *How does the use of interactive music in e-commerce affect purchase intention of low-involvement and high-involvement consumers?*

2 | RESEARCH GAP AND INTENDED CONTRIBUTION

The moderating role of consumer involvement has not been examined in interactive e-tailing platforms. For over a decade, a theory by Liu and Shrum (2009), the dual-process model of interactivity effects, remains as a prominent theory on this topic. Moreover, despite technology advancement in interactive interface design, scholars have not discussed how online consumer involvement can moderate the effect of multisensory SETs on customers' online shopping experience and purchase intention.

Therefore, the key contribution of the present research to marketing literature is to address how consumer involvement moderates purchase intention in an e-commerce environment with interactive background music, while extending theory (ELM and the dual-process model of interactivity effects) into a modern aspect of sensory marketing. The contribution shows the moderating role of consumer involvement with the application of visual and audio SETs (i.e., through the technique of interactive music) to provide new perspectives on sensory marketing in the modern digital landscape. This contribution adds to theory via the elaboration likelihood

model (Petty & Cacioppo, 1984) and the dual-process model of interactivity effects (Liu & Shrum, 2009).

3 | THEORETICAL BACKGROUND

3.1 | Interactive music: An integration of auditory and visual experience

Besides a leading role of visual design in sensory marketing, much of marketing communication is auditory in nature. Since the late 1980s, research has revealed the positive impact of music on gratifying customers' effect and communicating brand meanings (Park & Young, 1986; Stout & Leckenby, 1988). Traditionally, scholars considered audio effects as ambient elements that could impact mood (Park & Young, 1986), shopping time and pace (Kellaris & Kent, 1993; Milliman, 1986), and the purchase amount (Yalch & Spangenberg, 2000; Kellaris & Kent, 1992). However, more recent studies hold a different view of the function of musical stimuli and examine the effect of certain musical elements on consumers' perception and behavior. For instance, Lowe and Haws' (2017) study revealed the relationship between acoustic pitch and mental representation of product imagery, while Stewart and Koh (2017) constructed the mediation model of the effect of tempo on affective responses toward brands.

Consistently, these more recent studies reached two major conclusions: (a) the cognitive potential of musical stimuli and (b) the complementary effect of multisensory integration. First, with the use of brain imaging devices to sensory marketing research, such as electroencephalography and functional magnetic resonance imaging, studies have addressed how the structural design of auditory stimuli can expand peoples' cognitive bandwidth and help information processing (Berčík, Horská, Gálová, & Margianti, 2016; Rappaport et al., 2018). For instance, sound frequencies of background music that resonate with marketing messages can assist consumers' mental representation of products and enhance their evaluative judgment of product quality (Lowe & Haws, 2017; Sunaga, Park, & Spence, 2016). Furthermore, manipulation of mode and timbre of background music can intervene shoppers' task performance when they interact with on-screen features, leading to alterations in their decisions, time spent on a website, scroll direction, and the number of inquiry submissions (Rodriguez et al., 2019). These studies suggest that beyond facilitating pleasant emotional responses, music can "wire" the brain and bring additional cognitive value in shopping experiences.

Building on this revelation, other studies have consistently concluded that differing structural design of background music can influence consumer perception through cross-modal inferences (Lowe & Haws, 2017). Specifically, while effective use of audio stimuli can change visual processing of product and brand imagery, stronger visualization cues can also better encourage consumers to focus on information delivered through the audio channel (Lowe & Haws, 2017). Together, this integration of multisensory stimuli has positive outcomes on online consumers' behavioral intentions, such as product search, information seeking, and revisits to brand websites (Spence & Gallace, 2011; Spence et al., 2014). Additionally, the higher the extent of fit among various sensory inputs, the greater the effect of multisensory integration (Petit et al., 2019).

Synthesizing the above literature, we posit that interactive music (again, defined by Winkler, 2001 as the audio media where specific user actions lead to alteration in tempo, mode, texture, or volume), can elicit positive outcomes in e-commerce through two main reasons. The first, interactive music is expected to generate favorable impact on both cognitive and emotional responses. Besides the traditional view of music as a pleasant atmospheric cue and recent discussion on the cognitive potential of musical stimuli, interactive media interfaces can also enhance both cognitive and affective engagement (Wagner, Schramm-Klein, & Steinmann, 2018). On the emotional side, diverse on-screen interactive features can create enjoyable user experiences by offering perceptions of fun, novelty, and coolness while consumers navigate through a highly interactive e-commerce website (Xu & Sundar, 2014). On the cognitive side, on-screen interactions can enhance user engagement and assist shoppers to focus on brand and product content on an e-tailing platform (Sundar, Bellur, Oh, Jia, & Kim, 2016). The second, interactive music forms a multisensory experience by integrating visual presentation of an interface in its background music, which has been verified to consistently evoke preferable effects on consumers' behavioral and purchase intention (Wagner et al., 2018). In fact, with the increasing application of SETs, more and more studies have revealed promising outcomes of visual-audio integration on sensory marketing and e-commerce. However, scholars have not yet evaluated the outcomes of direct interaction with both visual and musical elements. Table 1 summarizes former consumer behavior research on the application of multisensory SETs in e-commerce, which demonstrates the deficiency of scholarly discussion on the topic. Beyond passive audio presentation in the background, the current study seeks to better understand how interacting with musical stimuli can provide additional value to sensory marketing and online retailing.

3.2 | The moderating role of online consumer involvement

With the use of SETs, sensory stimuli can operate through diverse pathways and influence more aspects of decision-making (Petit et al., 2019; Velasco et al., 2018). As a result, various antecedents are commonly included in empirical studies to explain the complexity of sensory effect. While digital engagement emerges as a prominent theme in recent e-commerce research, the moderating role of online consumer involvement remains at the focal point of digital consumer behavior research (Eigenraam, Eelen, Van Lin, & Verlegh, 2018; Scheinbaum, 2016). Up to date, Zaichkowsky's (1985), p. 32) cognitive-based approach (i.e., involvement defined as "perceived personal relevance and importance") as well as Ranaweera, McDougall, and Bansal (2005) viewpoint (i.e., involvement as a motivational state that forms the bond between a consumer and a product) are still widely adopted to understand and extract the meaning of

TABLE 1 Former research on the application of SETs in e-commerce and sensory marketing

Literature	Type of SET	Application of multisensory integration?	Direct interaction with audio stimuli?	Effects of interactivity assessed?	Main findings and/or conclusions
Li, Daugherty, and Biocca (2002)	3D advertising	No	No	Yes	3D advertising increased the sense of presence, creating a positive impact on product knowledge, brand attitude, and purchase intention.
Jiang and Benbasat (2004)	Virtual control on product view	No	No	No	Virtual product control (both visual and functional control) enhanced perceived diagnosticity and flow experience.
Zampini and Spence (2004)	Sound-attenuated mixer	Yes (visual + audio)	No	No	Augmentation of auditory cues generated a positive impact on the perception and evaluation of food products.
Kim and Forsythe (2008)	3D virtual reality	No	No	No	VR enhanced perceived ease-of-use, while the effect was moderated by attitudes, technology anxiety, and innovativeness.
Lee and Chung (2008)	3D virtual reality	Yes (visual + audio + haptic)	No	No	The use of VR enhanced enjoyment and perceived product quality, and customer satisfaction.
Park, Stoel, and Lennon (2008)	3D product visualization	No	No	No	The use of 3D rotation view in product presentation has a positive effect on perceived information quality, customer effect, attitude, and purchase intention.
Jin (2009)	3D virtual reality	Yes (visual + audio)	No	No	Low-involvement consumers perceived a higher sense of experiential richness in virtual shopping experience.
Animesh, Pinsonneault, Yang, and Oh (2011)	3D virtual reality	No	No	Yes	Flow experience augmented the positive effect of technological and spatial features of virtual reality, leading to a higher degree of purchase intention.
Gabisch (2011)	3D virtual reality	No	No	No	Virtual shopping experience was transferrable to brick-and-motor stores, while the relationship was moderated by self-image congruence and perceived diagnosticity.
Nah et al., 2011	2D versus 3D virtual reality	Yes (visual + audio)	No	Yes	Compared to 2D virtual reality, 3D virtual reality could further enhance flow experience (sense of presence) but also increase distraction during a shopping experience.
Cho and Schwarz (2012)	"Virtual mirror" (virtual try-on)	No	No	No	Consumers showed greater product favorability when they favor the images used to construct avatars in the virtual world.
Merle et al., 2012	Virtual try-on	No	No	Yes	Self-congruity in the virtual experience enhanced both hedonic and utilitarian values, leading to greater purchase intention.
Rahman, 2012	Multisensory product stimulation	Yes (visual + tactile)	No	No	Consumer used multiple sensory cues simultaneously for product evaluation, while cognitive and affective processing took place at the same time.

TABLE 1 (Continued)

Literature	Type of SET	Application of multisensory integration?	Direct interaction with audio stimuli?	Effects of interactivity assessed?	Main findings and/or conclusions
Song & Kim, 2012	3D product view	No (visual only)	No	No	3D product views reduced mental intangibility and increased perceived amount of product information, while consumers' perceived risk served as a moderator.
Brasel & Gips, 2014	Touch screen & haptic feedback	Yes (visual + haptic)	No	No	Touch-based interface (e.g., tablets, touchscreens, and touchpads) increased information seeking and led to higher product valuations.
Overmars & Poels, 2015	Haptic interface	Yes (visual + haptic)	No	Yes	Haptic feedback on interactive interface enhanced positive affect and suppressed negative emotional responses by fulfilling consumers' need for touch.
Huang & Liao, 2017	Augmented reality (AR)	Yes (visual + haptic)	No	No	Sense of self-location and haptic imagery mediated multisensory consumer experience through three psychological pathways (i.e., embodiment, sense of control, and self-explorative engagement).
Van Kerrebroeck et al., 2017	Touch-enabling interface	Yes (visual + haptic)	No	No	Touch-enabling technology provided both hedonic and utilitarian values to consumers throughout the prepurchase to path-to-purchase stages.
Pantano et al., 2017	Virtual glasses	No	No	No	Virtual product try-on had a positive impact on consumer attitude and enjoyment throughout the shopping experience as well as perceived usefulness and ease-of-use of products.
Poushneh and Vasquez-Parraga (2017)	AR	No	No	Yes	The use of AR in e-commerce enhanced utilitarian, hedonic, and esthetic values of user experience, leading to greater customer satisfaction and willingness to buy.
Yim, Chu, and Sauer (2017)	AR	Yes (visual + audio)	No	Yes	AR generated effective brand communication through a heightened sense of novelty, immersion, enjoyment, and usefulness.
Beck and Crié (2018)	Virtual fitting room (VFR)	No	No	No	The use of VFR on e-commerce websites promoted product search, leading to greater purchase intention in both online and offline stores.
Scholz and Duffy (2018)	AR mobile app	Yes (visual + audio)	No	No	Findings showed a positive effect on the brand relationship when the branded mobile app was incorporated into consumers' intimate space and with their sense of self.

Abbreviation: SET, sensory-enabling technology.

consumer involvement. However, in today's interactive e-commerce environment, the operational pathways of online consumer involvement can go beyond the traditional two routes of the elaboration likelihood model (Petty & Cacioppo, 1984)—A theory that helps base this hypothesis.

Early literature applied two separate routes to explain how high- and low-involvement consumers are influenced by central and peripheral cues respectively. Specifically, high-involvement consumers employ the central route, and their decision-making process and behavior are heavily influenced by product-relevant information. While low-involvement consumers are less motivated to conduct extensive elaboration, their evaluation toward products and brands as well as their behavior are subject to affective or peripheral factors (e.g., Johar, 1995; Mittal, 1995; Yang, Hung, Sung, & Farn, 2006). However, in today's e-commerce environment, the moderating effect of consumer involvement can no longer be simplified through the two discrete pathways, as both high- and low-involvement consumers are exposed to and influenced by the interplay of utilitarian and experiential elements (Chiu, Wang, Fang, & Huang, 2014; Martín, Camarero, & José, 2011). Online consumers now evaluate brands and products holistically through both elaborative information and the unique design of virtual storefronts (Lemke, Clark, & Wilson, 2011; Mollen & Wilson, 2010). Therefore, neither are high-involvement consumers indifferent to experiential cues nor are low-involvement shoppers ignorant of product-relevant information. The current study thus investigates how involvement moderates the effect of multisensory SETs on both experiential and cognitive dimensions of shopping experience.

3.3 | Consumer involvement as a moderator of interactive background music

As both musical and interactive stimuli can function as peripheral cues or elaborative aids, the level of consumer involvement can be particularly important in determining the effect of interactive music on digital shoppers. Former research has investigated how involvement moderates the impact of the sound effects on various dimensions of consumer perception and behavior. Nevertheless, the moderating effect of consumer involvement on SET-augmented shopping experience remains unclear. In fact, through extensive literature review, we noticed a deficiency in scholarly discussion on consumer involvement as a moderator of interactivity, regardless of the agile advancement in on-screen interactive techniques. As summarized in Table 2, a limited number of experimental studies have incorporated an interactive e-commerce environment, with even less to assess the effect of interactivity at different levels of consumer involvement.

Some of these studies have shown that whereas musical stimuli do not tune exclusively to a certain type of customers, but their operational pathways do differ for low- and high-involvement consumers. For low-involvement consumers, emotion-laden characteristics of background music (e.g., familiarity, referential cues of personal experience, and subjective perception toward the music) enhance their message-based processing through a heightened level of attention and elicit non-message-based processing through emotional responses (MacInnis & Park, 1991). On the other hand, music-brand congruency assists high-involvement consumers to focus on the cognitive processing of product information (Hee Park, Kwan Park, & Ok Jeon, 2014). Similarly, recent sensory marketing research has rejected the conventional view of music as a distraction and suggested that effective auditory design can enhance consumer engagement of both high- and low-involvement users (Lowe & Haws, 2017; Spence, 2019).

Given these research findings, it is likely that interactive music can also enhance consumer engagement for both high- and low-involvement consumers, even though the way it encourages their engagement may differ depending on the target consumer groups. The literature summarized in Table 2 commonly implies that the presence of peripheral features like interactivity does have a greater impact on low-involvement users in general, through pleasure and arousal (Ha & Lennon, 2010), and satisfying brand experiences (Tseng & Wang, 2012). However, high-involvement users can be also cognitively more engaged by the peripheral features that suggest higher content quality (Ranaweera et al., 2005) or those that allow them to actively explore the product features (Levy & Nebenzahl, 2008; Liu & Shrum, 2009). Therefore, interactive background music may carry out two different functions: for low-involvement consumers, it would convey higher experiential value of the shopping website, such that the shopping experience is enjoyable by itself; for high-involvement consumers, it may further encourage their cognitive engagement with the shopping task since the interactivity of background music enables greater control over their shopping experience. The following sections synthesize studies from domains of sensory marketing, consumer behavior, and HCI to further explain how involvement can moderate the effect of interactive music on experiential value, cognitive value, and purchase intention.

3.3.1 | Experiential value

According to Mathwick & Rigdon's (2004) groundwork, consumers' direct interaction and appreciation of retail channels form experiential value in e-commerce. Constructs of experiential value includes both extrinsic and intrinsic dimensions, including esthetics, entertain, escapism, and enjoyment (Mathwick & Rigdon, 2004), and can be assessed through a dynamic spectrum of perceived interactivity, telepresence, and user engagement induced by interactive technology (Brodie, Ilic, Juric, & Hollebeek, 2013; Lemke et al., 2011; Mollen & Wilson, 2010). In particular, interactive music can provoke positive experiential value for low-involvement consumers through two pathways. The first, through visual and auditory content changing in real-time, on-screen interactive features offer customized experiences (Yoon & Youn, 2016), which bring out the positive impact on consumers' heuristic evaluation toward an e-commerce website, its brand, and products (Srinivasan, Anderson, & Ponnavolu, 2002). Specifically, Liu and Shrum (2009) suggested the presence of on-screen interactive features can lead to positive consumer attitudes

TABLE 2 Selected literature on the moderating effects of consumer involvement

Literature	Integration of interactive techniques?	Independent variables	Dependent variables	Effects of interactivity assessed?	Main findings and/or conclusions
Petty and Cacioppo (1984)	No	Argument quality of advertisements	Product attitude	No	Argument quality has a greater impact on highly involved consumers, while product endorsement has a greater impact on low-involvement consumers.
Homburg and Giering (2001)	No	Sales process	Customer satisfaction and loyalty	No	A high level of consumer involvement moderates the effect of the sales process on customer satisfaction and loyalty.
Laroche et al. (2003)	No	Intangibility versus tangibility of product	Perceived risk	No	Intangibility of the product shows a stronger correlation with perceived risk when consumers are highly involved.
Ranaweera et al. (2005)	No	Website quality	Web satisfaction	No	Higher levels of involvement will have a positive reinforcing effect on the relationship between perceived website quality and website satisfaction.
Suh and Yi (2006)	No	Customer satisfaction, corporate image, attitude toward ads	Brand attitude and loyalty	No	As the level of involvement increases, the effects of satisfaction on brand attitude and loyalty decreases.
Levy and Nebenzahl (2008)	Yes	Presence of interactivity in advertisements	Number of clicks and amount of time spent interactively	Yes	Program involvement was found with negative effects and product involvement was found with positive effects on the degree of interaction and the time spent interactively on with the video content.
Lee, Park, and Han (2007)	No	Proportion of positive versus negative reviews	Conformity effects	No	When the proportion of negative reviews increase, low-involvement consumers conform to reviewers' perspectives; conformity of high-involvement consumers depends on the quality of reviews' argument.
Olsen (2007)	No	Satisfaction, social norms, and perceived control	Repurchase loyalty	No	Involvement is positively related to repurchase loyalty and customer satisfaction.
Liu and Shrum (2009)	Yes	Interactivity in online shopping websites	Brand Attitude	Yes	For low-involvement consumers, the mere presence of interactive features can lead to a positive brand attitude. For high-involvement consumers, the effects of interactivity depend on users' experience of Internet usage.
Ha and Lennon (2010)	No	Website design	Pleasure, arousal, purchase intention, approach behaviors	No	Low task-relevant web cues induce more pleasure and arousal for low-involvement consumers, leading to a greater extent of purchase intention and approach behaviors.

(Continues)

TABLE 2 (Continued)

Literature	Integration of interactive techniques?	Independent variables	Dependent variables	Effects of interactivity assessed?	Main findings and/or conclusions
Martin et al. (2011)	Yes	Service quality, warranty, security privacy, design, interactivity	Customer trust and satisfaction	Yes	Interactivity has no effect on customer trust and satisfaction when consumer involvement is high and has a negative effect on low-involvement consumers.
Tseng and Wang (2012)	No	Consumer satisfaction	Reuse behavior	No	Customer satisfaction has a positive effect on reuse behavior of low-involvement consumers but *ns* effect on high-involvement.
Kwon, Ha, and Kowal (2017)	No	Value congruence, product distinctiveness	Attitude toward customization, satisfaction with retailers	No	The positive effect of value congruence on attitude and satisfaction is greater on high-involvement consumers; the positive effect of product distinctiveness is greater on low-involvement consumers.
Jang, Baek, and Choo (2018)	No	Visual complexity	Pleasure, arousal, approach behavior	No	High visual complexity has a negative effect on the pleasure of low-involvement consumers, but such negative effects of visual complexity diminished in consumers with high-involvement.

Abbreviation: *ns*, not significance.

and affects web content among low-involvement consumers. The second, by eliciting a higher extent of interface vividness and sensory integration, interactive music can produce a sense of novelty and promote positive customer sentiment (Fortin & Dholakia, 2005). In contrast, while high-involvement consumers are widely exposed to the innovative brand and product presentations, they hold a higher expectation for application of interactive techniques and are "harder to please" (Lee & Chang, 2011). Therefore, the current study proposes:

H1: *The use of interactive music in e-commerce will yield greater experiential value for low-involvement consumers than for high -involvement consumers.*

3.3.2 | Cognitive value

Former research suggested both musical and interactive stimuli can have either a positive or negative effect on the cognitive value on user experience. On one hand, the integration of both sensory and interactive features can make users more immersed in message processing and promote their cognitive engagement. In addition, on-screen interactive techniques allow consumers to selectively consume product and brand information pertaining to their needs and accommodate their information processing style (Sicilia, Ruiz, & Munuera, 2005; Xu & Sundar, 2016). This can result in a reduction of consumers' search costs, leaving them more cognitive bandwidth to evaluate the product and message quality (Hasan, 2016; Mollen & Wilson, 2010). Interactive and multisensory interfaces demand greater mental resources of online shoppers (Ariely, 2000; Richard & Chebat, 2016), which can result in cognitive overload and frustration (Cook & Coupey, 1998; Jiang, Chan, Tan, & Chua, 2010). According to Liu and Shrum (2009), whether a highly stimulating website leads to a facilitating or inhibiting effect on consumers depends on the balance between the cognitive cost of interactivity and the availability of cognitive resources, such as expertize in internet usage and familiarity with interactive techniques.

Taken this tradeoff into concern, whether users take advantage of the technical affordance of SETs can determine their impeding or facilitating effect on cognitive processing. According to Liu and Shrum's (2009) hypotheses, under a low-involvement condition, as consumers are less motivated to exploit the full potential of on-screen features on an e-commerce website, interactive techniques have limited effect on enhancing elaboration. Moreover, given that low-involvement consumers allocate less mental resources to conduct shopping tasks, highly stimulating content can even turn into cognitive burden or distraction (Jiang et al., 2010; Liu & Shrum, 2009). By contrast, highly involved consumers are more likely to apply multimodal techniques to control information flow, to selectively consume brand content, and to accommodate the pace and orientation of their own shopping preferences (Van Noort, Voorveld, & Van Reijmersdal, 2012). For these consumers, the use of SETs can be perceived as a useful tool to engage their attention to a greater extent. Therefore, the present study proposes:

H2: *The use of interactive music in e-commerce will yield greater cognitive value for high-involvement consumers than for low-involvement consumers.*

3.3.3 | Purchase intention

There are two rationales that explain the moderating effect of involvement on purchase intention. First, purchase decisions are made very differently between high-involvement and low-involvement consumers from a cognitive processing perspective. While low-involvement consumers are one-stop shoppers, they perform limited alternative evaluation and inferential thinking, as their goal is to apply a small number of criteria to buying within a short amount of time (Sanchez-Franco & Rondan-Cataluña, 2010). As a result, interactive features have limited potential in assisting information search for this group of customers (Ariely, 2000; Sharma, Sivakumaran, & Marshall, 2010). In fact, when low-involvement consumers complete shopping tasks with heuristics or information shortcuts, the presence of sophisticated SETs can be perceived as cognitive burdens (Atkinson & Rosenthal, 2014). Meanwhile, high-involvement consumers pursue adequate information, rely on multiple performance criteria for evaluation, and are variety-seekers (Sharma et al., 2010). Therefore, the technical affordance of interactive features can provide benefits to their elaborative processing (Oh & Sundar, 2015), and a unique design with multisensory integration may better appeal to highly involved shoppers as well. From this perspective, interactive music is more likely to promote the purchase intention of high-involvement consumers, as it provides greater cognitive value to this group of highly engaged users.

Secondly, involvement can be an effective predictor of the extent to which a consumer is concerned with different experiential modalities of an e-commerce website; specifically, high-involvement consumers are more critical toward the quality of website features (Lee & Chang, 2011). In addition, as mentioned earlier, while high-involvement shoppers constantly seek for the unique shopping experience, virtual stores require a higher level of originality and innovation to achieve a sense of unexpectedness among the group of customers (Mathwick & Rigdon, 2004; Shobeiri, Mazaheri, & Laroche, 2015). Therefore, high-involvement consumers do not necessarily provide positive reactions, or simply put, are "hard to please," when it comes to applying novel, interactive technology to create experiential value in the digital merchandising space. In comparison, while the mere presence of interactive and multisensory stimuli can provide hedonic value, low-involvement consumers are more likely to regard the use of SETs as fun, interesting, and exciting. The positive sentiments result in a more favorable attitude and stronger behavioral intention in an online store. In this regard, interactive music would more effectively encourage the purchase behavior of low-involvement consumers.

Given the two competing streams of former research findings, though the formation of purchase intention in a multisensory e-commerce space has become more complicated and less predictable, both experiential and cognitive value served impactful roles in consumers' shopping experience and purchase decision. Therefore, besides investigating the central research question regarding the moderating effect of consumer involvement on purchase intention, we further proposed experiential and cognitive value mediate consumers' intent to purchase in an interactive e-commerce environment.

H3a: *Experiential value mediates the impact of interactive music on purchase intention.*

H3b: *Cognitive value mediates the impact of interactive music on purchase intention.*

In summary, the theoretical framework of the present study is conceptualized in Figure 1. From a theoretical perspective, the key intended contribution of the present study to the interactive marketing literature is to address the interrelationship among these variables

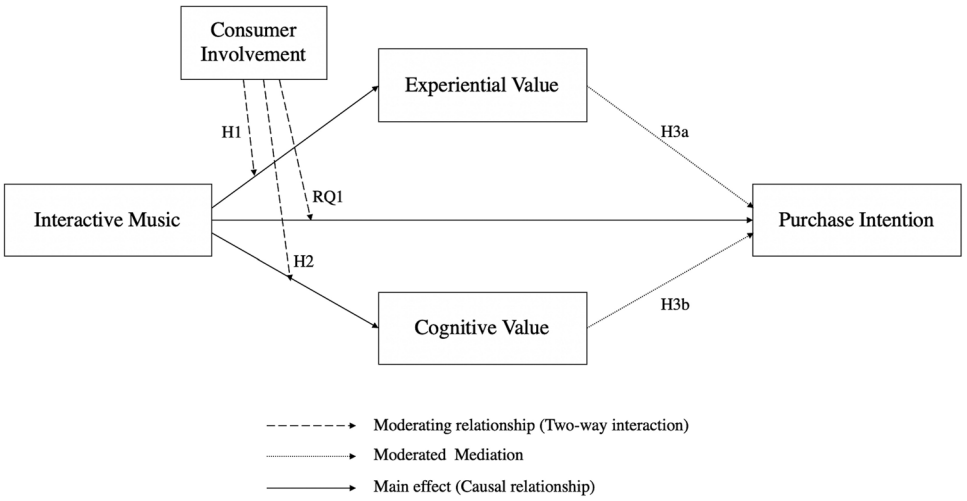

FIGURE 1 Conceptual framework of the present study. Solid lines indicate the main effect. Dashed lines indicate the moderating effect (two-way interaction). Dotted lines indicate moderated mediation

while extending ELM and dual-process model of interactivity effects into a modern aspect of sensory marketing.

4 | METHODS

4.1 | Research design

An author created an e-commerce website and implemented a common technique of interactive music, *soundtrack layering*, which refers to layering additional tracks of melody or beats to the original music (Fraser & Bradford, 2013). Particularly, the impact of musical dynamics on online consumer behavior and the intention was examined by a single-factor experiment with three conditions: The control condition without any background music, the static background music condition, and the interactive music condition.

While participants encountered the same visual website content in all three conditions, in the condition with interactive background music, users could initiate or cease various soundtrack layering effects by clicking on different buttons on each product page. In contrast, in the static background music condition, there was no change in the audio regardless of one's clicking actions. Both the interactive music condition and the static background music condition applied the same music to its e-commerce environment; the only difference was whether consumers could control and make changes to its layering effect. In the control condition, there was no background music employed on the website. Two self-reported questionnaires were used to collect data before and after participants navigated the stimulus website. Click and log data of the test subjects were also recorded. The study was first conducted on student samples recruited from the participant pool of a large public research university (Study 1), it is then replicated and extended with a nonstudent sample using Mechanical Turk (MTurk; Study 2). MTurk participants were recruited using the following criteria: (a) HIT approval rate for all requesters' HITs is higher than 97%, (b) number of HITs approved is greater than 1000, and (c) participants' location is in the U.S. These criteria are in addition to the screener questions, which will be detailed in the procedure. In addition, we used different pieces of background music in Studies 1 and 2 to examine the generalizability of our empirical findings.

4.2 | Pilot study

To eliminate flaws on the stimulus websites and to ensure instructions and survey questions were elaborative and understandable, before the formal launch of the experiment, 74 individuals were invited from the lead author's personal network to visit the stimulus websites and respond to the questionnaire. No compensation was provided. Among the volunteers, 30 (40.54%) were male and 44 (59.45%) were female. Their average age was 27.55 (standard deviation [*SD*] = 5.09, min = 18, max = 36, skewness = 0.14). The two leading ethnic groups were Caucasian (38.67%) and Asian (34.67%), followed by African American (16.00%) and Hispanic (9.33%). Defects on the shopping sites and confusion in the questionnaires were revised according to feedback provided by the group of volunteers.

4.3 | Stimulus and manipulation

Three websites with a fictitious brand name, *About Leather* (www.aboutleather.net), were constructed (by the lead author) especially for this research. Figure 2 is a screenshot of the product page on the stimulus website. All of them shared the same page content and presented 11 leather products, ranging from $20 to $85. Music with major mode and regular tempo (90–102 beats per minute, bpm) has been found to yield the moderate extent of stimuli (Schwartz et al., 2017). Thus, in the interactive and static music conditions, the same piece of music (Study 1: G-major jazz music, 95 bpm; Study 2: D-major chill ambient music played by acoustic guitar, 94 bpm) was presented to align with the atmosphere of the website. To ensure that participants in the condition with interactive music were aware of the interactive feature of the website, a text-box popped up and informed users of "you can make changes in the background music by clicking on any button on the site" at the beginning of the online shopping task. As these participants browsed through the website, they were able to initiate or cease various soundtrack layering effects, including layering additional melody or beats, or both, by clicking on any button on the website. In contrast, in the static background music condition, the audio content did not alter regardless of participants' click. In the control condition, participants browsed the same shopping website without any background music.

4.4 | Participants and procedure

4.4.1 | Study 1

A total of 319 undergraduate students from a large public university's research pool were recruited for the online experiment in exchange for course credit. No other compensation was provided. Before the experiment, participants were asked to complete a consent form and a pre-questionnaire that asked their music listening habits, current online shopping habits, and demographics. Participants were then randomly assigned to one of the three conditions (i.e., interactive music, static background music, and control). Then, they were instructed to complete a shopping task by placing at least three items in their online shopping carts. Illustrations and step-by-step guidance were provided beforehand to demonstrate how to perform the shopping task. They were asked to spend at least 3 minutes on the e-commerce website that was created for this study and this was verified. Participants in the interactive and static music conditions were informed to turn on the volume on their devices.

Afterward, participants responded to a post-questionnaire. The post-survey included manipulation checks and multiple scales for participants to report their perceived interactivity, experiential value,

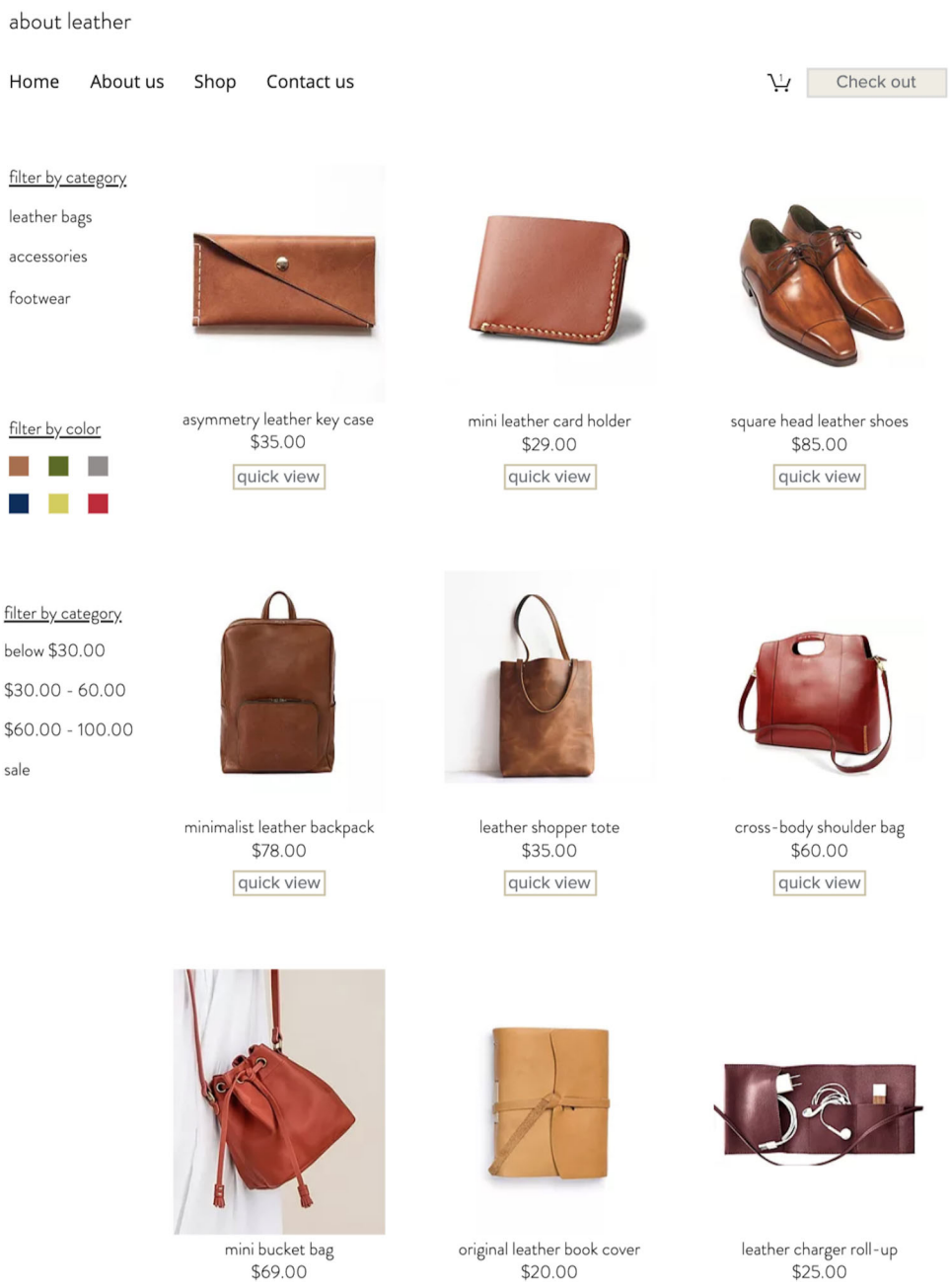

FIGURE 2 A screenshot of the stimulus website [Color figure can be viewed at wileyonlinelibrary.com]

cognitive value, and purchase intention toward the stimulus website. To eliminate the confounding effect of distinct on-screen layouts, respondents were asked to report their screen sizes, and those using mobile devices (i.e., smartphones and tablets) were excluded from the sample. In addition, participants' click data were tracked, and those who did not complete the instructed shopping task and spent less than 3 minutes on the website were also filtered out. In results, 98 participants were recorded under the control condition, 77 under the static music condition, and 76 under the interactive music condition. 52 males and 199 females were included in the study. The average age was 20.4 years old, and the majority were Caucasian (51.1%), followed by Hispanic (26.3%), and Asian (16.3%).

4.4.2 | Study 2

Nonstudent samples participants were recruited using MTurk in exchange for $0.75 cash compensation to complete the online study. Besides the three sections in Study 1, an audio task was added to Study 2, where the online study flow consisted: (a) pre-survey, (b) audio task, (c) website stimulus, and (d) post-survey. The audio task was designed to ensure participants could hear the audio on the stimulus properly. The first, participants were provided with guidelines to set up their audio devices. As the stimulus website autoplayed background music while participants entered the online store, participants were provided with step-by-step instructions to allow

audio auto-play on their browsers. After, the online questionnaire auto-played a piece of music and asked participants to identify which of the three audios was the one they just heard. Specifically, music in the question was auto-played for 20 s (i.e., participants have no control to play/pause the music), while in the selection options, participants could play the clips on their own. Three pieces of audio were presented in the options, including a piece of hip-hop music, hard rock music, and classical music. Participants could not proceed to the next section until they answered the audio task correctly, and they were given two attempts to respond. In each trial, one of the three options was auto-played randomly, meaning that participants did not necessarily hear the same piece of music in the question again, and thus they were not prone to a higher chance of responding correctly in their second attempt. If they failed twice, they were directed to the end of the survey, noting that their audio set-up did not meet the requirements to complete the rest of the study. If they responded correctly in the audio task, they could proceed to complete the rest of the study. Initially, 341 MTurk users consented to participate in our online study, while 230 of them were able to follow to our study instructions, to pass the pre-stimulus audio task, and to complete the entire survey.

Similar to Study 1, participants were then randomly assigned to one of the three conditions (i.e., interactive music, static background music, and control). Then, they were instructed to complete a shopping task by spending at least 3 minutes on the stimulus websites and placing at least three items in their online shopping carts. Afterward, participants responded to a post-questionnaire. Content of the post-survey was the same as that of Study 1, except that a few additional questions were added to create a more robust manipulation check and additional measurements were added to capture relevant control and mediating variables. Log data of browsing time and click actions were as well tracked for Study 2. Participants were disqualified from the study if they (a) used mobile devices to complete the study, (b) did not answer correctly to the audio task, or (c) did not spend at least 3 min and put at least 3 items in their shopping carts. After applying the filtering criteria, 218 participants were included for data analysis. In results, 61 participants were recorded under the control condition, 80 under the static music condition, and 77 under the interactive music condition. In the sample, 116 identified as males, 82 identified as females, and 20 participants preferred not to respond. The average age was 37.52 years old, and the majority were Caucasian (69.3%), followed by African American (16.1%) and Asian (8.3%).

4.5 | Measurement

All self-reported items were measured by a seven-point Likert type scale unless specified otherwise. The pre-questionnaire was designed to capture respondents' individual differences, including their internet usage behavior and their music listening habits. Demographic data were also collected in the pre-test survey. The posttest questionnaire started off with manipulation checks, followed by participants' evaluation on cognitive and experiential values of the stimulus e-commerce website as well as their purchase intention toward the fictitious brand, *aboutleather.com*, and its products.

4.5.1 | Individual differences

Measurement for individual differences includes internet usage, music listening habits, and demographics.

Internet usage

Respondents were first asked to report *the number of hours of Internet use per day* (Study 1: M = 8.12, min = 2, max = 24, *SD* = 3.91; Study 2: *M* = 9.23, min = 2, max = 24, *SD* = 4.35). Adopting from Chen (2015)'s scales, *purposes of Internet usage* measured by the frequency that a subject utilizes the Internet under six different purposes on a scale from 1 (never) to 7 (All the time; see Table 3). The third, participants were asked about their *comfortability with navigating on the first visit to a website* (Study 1: *M* = 6.01, *SD* = 1.05; Study 2: *M* = 6.07, *SD* = 1.13; Chen, 2015). None of these variables varied across the three conditions.

Music listening habits

Using Lee and Downie's (2004) scales, the pre-questionnaire captured respondents' music listening habits through the following

TABLE 3 Frequency table of respondents' internet usage purposes

	Mean		Standard deviation		*F* value	
Purposes of internet usage	**Study 1**	**Study 2**	**Study 1**	**Study 2**	**Study 1**	**Study 2**
Professional purposes	5.52	5.84	1.25	1.17	0.57	1.21
Communication	5.57	5.18	1.25	1.45	0.03	1.01
Gaming	2.03	2.18	1.41	1.30	0.23	0.75
Online shopping	4.39	5.77	1.47	1.21	1.12	0.24
Information seeking	5.48	5.52	1.26	1.31	1.57	0.83
Entertainment	5.41	5.52	1.33	1.43	0.45	1.10

TABLE 4 Frequency table of respondents' music listening behavior by major music genres

	Mean		Standard deviation		*F* value	
Music genre	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2
Jazz	1.86	4.52	1.16	1.68	1.42	0.23
Blues	1.71	4.45	1.12	1.68	1.33	0.40
Hip-hop	4.26	4.64	1.65	1.95	0.70	0.004
Rock	3.30	5.44	1.68	1.54	0.11	1.008
Pop	4.66	5.24	1.46	1.48	0.45	0.59
Classical	2.08	4.70	1.31	1.61	1.34	0.29
Country	2.68	3.98	1.77	2.13	0.74	1.18
Electronic	2.90	4.42	1.73	1.77	1.69	2.88

questions: A binary scale asked whether a respondent is a *music professional*, where 3.98% of the sample in Study 1 and 16.5% in Study 2 are professional in music practices.seven-point Likert scale from 1 (not at all) to 7 (Everyday) asked if a respondent *plays a musical instrument on a regular basis* (Study 1: $M = 0.64$, $SD = 1.45$; Study 2: $M = 1.52$, $SD = 1.48$). *Music listening frequency* was measured by a continuous scale from 1 to 24, recording how many hours a respondent listens to music every day (Study 1: $M = 4.45$, min = 0, max = 24, $SD = 3.51$; Study 2: $M = 5.14$, min = 0, max = 23, $SD = 5.59$). In addition, the frequency they listen to each of the eight major music genres is summarized in Table 4. None of these variables varied across the three conditions.

Demographics

The gender, age, and ethnicity of respondents were recorded in Study 1. In addition, considering participants in Study 2 were non-student samples, their highest level of education and annual household income were also measured. Table 5 summarizes the demographics of the present sample. None of these variables varied across the three conditions.

4.5.2 | Audio environment

In Study 2, we asked participants to report the audio devices (in-ear earphones: 27.52%; over-head headphones: 19.72%, speakers from computers: 51.37%; others: 1.40%) and browsers (Chrome: 84.40%; Safari: 1.83%; and Firefox: 13.76%) they used to complete the online study. Specifically, images of different audio devices alongside each option so that participants were not confused by the descriptions of each audio device type. Besides, we asked participants to report the level of volume of their audio devices on the scale of 0–100 they applied during the study ($M = 60.37$, min = 1, max = 100, $SD = 26.32$; Biswas et al., 2019).

4.5.3 | Consumer involvement

As used in Liu and Shrum's (2009) former research, the personal involvement scale by Zaichkowsky (1985) was adapted to measure consumer involvement. Five bipolar scales (unimportant–important, irrelevant–relevant, means nothing–means a lot, of no concern–of

TABLE 5 Frequency table of respondents' demographics

	Mean		Standard deviation		*F* value	
Demographics	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2
Gender[a]	1.79	1.55	0.41	1.68	0.52	0.23
Age	20.31	37.36	1.65	1.68	1.75	0.40
Ethnics[b]	2.95	2.74	1.02	1.95	.46	0.004
Education[c]	N/A	4.07	N/A	1.54	N/A	1.008
Income[d]	N/A	2.70	N/A	1.77	N/A	2.88

[a]Gender is coded using a numeric scale, where male = 1, female = 2, and others = 3.

[b]Ethnics is coded using a numeric scale, where Asian = 1, Black or African American = 2, Caucasian = 3, Hispanic = 4, multi-races = 5, and others = 6.

[c]Education is coded using a numeric scale, where less than high school degree = 1, high school degree or equivalent (e.g. GED) = 2, some college but no degree = 3, undergraduate degree = 4, and graduate degree = 5.

[d]Income (total combined household income last year) is coded using a numeric scale, where less than $25,000 = 1, $25,000 to $49,999 = 2, $50,000 to $74,999 = 3, $75,000 to $99,999 = 4, $100,000 and greater = 5.

much concern, not needed–needed) assessed the extent to which a respondent involves in online shopping (Study 1: $M = 5.21$, $SD = 1.12$, Cronbach's $\alpha = 0.91$; Study 2: $M = 5.53$, $SD = 1.19$, Cronbach's $\alpha = 0.89$).

4.5.4 | Manipulation check

Items measured in the post-questionnaire and descriptive statistics are summarized in Table 6. Manipulation checks in the present research utilized log data, audio check, and self-report scales of web interactivity to ensure the three experimental conditions operated appropriately as designed.

Log data

For both studies, log data was used to check (a) the time spent on the stimulus websites (Study 1: $M = 4.54$, $SD = 1.11$; Study 2: $M = 5.21$, $SD = 1.20$), (b) counts of click actions (Study 1: $M = 6.78$, $SD = 1.13$; Study 2: $M = 5.21$, $SD = 1.20$), and (c) numbers of items placed in the shopping cart (Study 1: $M = 3.35$, $SD = 0.89$; Study 2: $M = 4.94$, $SD = 1.49$).

Audio check

Both studies asked if participants heard background music and if they noticed there is any change in the background music when they clicked on different buttons on the stimulus websites. In addition, Study 2 asked participants to select the piece of background music they heard on the stimulus websites and to select the piece of additional soundtracks layering on the original background audio. For both questions, participants may respond with "there is no background music" or "there is no additional layering soundtracks." In results, 12 participants did not pass the audio check and were thus excluded from data analysis.

TABLE 6 Items of measurement in the post-questionnaire

Scale	Mean (*SD*)	Questions
Manipulation check (perceived control)	Study 1	"I felt that I had a lot of control over my visiting experiences on this website."
	4.30 (1.01)	
	$\alpha = 0.95$	"While I was on the website, I could choose freely what I wanted to see."
	Study 2	
	3.70 (2.30)	"While surfing the website, I had control over what I can do on the site."
	$\alpha = 0.93$	"While surfing the website, my actions decided the kind of experiences I get."
Manipulation check (interactive music)	Study 1	"I could interact with the background music."
	3.47 (1.05)	
	$\alpha = 0.90$	"I could make a change in the background music."
	Study 2	"I heard additional melody on the original background music when I clicked on buttons on the website."
	4.54 (1.73)	"I heard additional beats on the original background music when I clicked the buttons."
	$\alpha = 0.94$	"The background music responded to my clicking actions."
Cognitive value	Study 1	"I evaluated products with its features and factors."
	4.60 (1.13)	"I thought about what actions I might take based on what I consumed from the website."
	$\alpha = 0.85$	"I found myself making connections between the product information and my common sense or prior knowledge."
	Study 2	"I made comparisons among multiple products on the site."
	5.32 (1.02)	"I compared the brand and its products with those of other brands."
	$\alpha = 0.81$	"I tried to relate the brand's products to my own user experiences."
Experiential value	Study 1	"The enthusiasm of the site was catching; it picked me up."
	3.46 (1.15)	"The site didn't just sell products. It entertained me."
	$\alpha = 0.91$	"Shopping on the site "got me away from it all."
	Study 2	"I shopped on the site for the pure enjoyment of it."
	4.69 (1.68)	
	$\alpha = 0.91$	
Purchase intention	Study 1	"Out of every $100 I spend on **online shopping**, I would like to spend ___ at the online store."
	25.30 (15.93)	
	$\alpha = 0.87$	"Out of every $100 I spend on **leather goods**, I would like to spend at the online store."
	Study 2	
	37.55 (12.11)	
	$\alpha = 0.83$	

Abbreviation: *SD*, standard deviation.

Self-report interactivity

Both studies also included a manipulation check for interactivity using two scales. The first, five items adapted from Sundar et al. (2015) measured respondents' perceived control, asking participants to indicate how interactive the website was, and to what degree they perceived a sense of control and freedom while accessing information on the website (Study 1: $M = 4.30$, $SD = 1.01$, Cronbach's $\alpha = 0.95$; Study 2: $M = 3.07$, $SD = 2.30$, Cronbach's $\alpha = 0.93$). The second, five more items were created to ask if the user noticed any difference in the background music when they clicked on buttons in the interactive panel on a product page to initiate changes in the background music (Study 1: $M = 3.47$, $SD = 1.05$, Cronbach's $\alpha = 0.90$; Study 2: $M = 4.54$, $SD = 1.73$, Cronbach's $\alpha = 0.94$).

4.5.5 | Cognitive value

Six items of elaboration were also measured to investigate the extent to which respondents engaged in inferential thinking toward information obtained from the stimulus website, including whether they evaluated features of the products, made connections and compared with prior knowledge or external information of the product type (O'Brien & Toms, 2008; O'Brien, Cairns, & Hall, 2018; Study 1: $M = 4.60$, $SD = 1.13$, Cronbach's $\alpha = 0.85$; Study 2: $M = 5.32$, $SD = 1.02$, Cronbach's $\alpha = 0.81$).

4.5.6 | Experiential value

Measurements from Jiang et al. (2010)'s study were adapted to measure respondents' perceived experiential value of the stimulus website. Four items asked participants to evaluate the intrinsic enjoyment that came from engaging in the shopping task. Additionally, they were asked to reflect whether the shopping experience went beyond their expectation and whether the website provided value besides transactional functions (Study 1: $M = 3.46$, $SD = 1.15$, Cronbach's $\alpha = 0.91$; Study 2: $M = 4.69$, $SD = 1.68$, Cronbach's $\alpha = 0.91$).

4.5.7 | Purchase intention

Purchase intention was measured by two items adapted from Babin and Attaway (2000). The two questions asked participants to fill in blanks indicating (a) the amount out of every $100 spent on online shopping that he/she would spend at the stimulus online store, (b) the amount out of every $100 spent on the brand's product category (i.e., leather goods) that he/she would spend at the stimulus online store (Study 1: $M = 25.30$, min = 0, max = 100, $SD = 15.93$, $r = 0.83$, $p < .001$; Study 2: $M = 37.55$, min = 0, max = 100, $SD = 12.11$, $r = 0.99$, $p < .001$).

4.5.8 | Perception toward the stimulus music

In Study 2, we included four additional scales measuring participants' perception toward the piece of music used on the stimulus website. Specifically, we used two sing-scale questions asking *whether participants liked the music* ($M = 4.72$, $SD = 1.61$) and whether they think *the music is a good fit* with the online shopping website and its products ($M = 4.65$, $SD = 1.51$). Besides, we measured the extent to which the piece of music generated *high arousal sentiment* (i.e., exciting, delightful, pleasing, passionate, $M = 4.37$, $SD = 1.52$, Cronbach's $\alpha = 0.92$) and *low arousal sentiment* (i.e., calm, relaxing, serene, comforting, $M = 4.69$, $SD = 1.68$, Cronbach's $\alpha = 0.95$).

5 | RESULTS

First, one-way analysis of variance (ANOVA) with post hoc tests were used to check whether the manipulation of interactive music was effective and whether the reported values of the dependent variables (i.e., cognitive value, experiential value, and purchase intention) varied across the three conditions. Next, a general linear model (GLM) was used to perform univariate analyses, investigating whether interaction effects exist between consumer involvement and interactive music. Consumer involvement was standardized and entered as a moderator. Last, the Model 1 of PROCESS macro (Hayes, 2018) and Johnson–Neyman technique was used to further examine statistically significant regions of interactions. Participants' Internet usage and music listening behavior, and demographic data were controlled for in all analyses. In addition, participants' perceptions toward the background music on the stimulus website as well as the audio environment they applied during the study was controlled for data analysis in Study 2. Table 7 presents the zero-order correlations among all variables used in the analysis.

5.1 | Manipulation check

One-way ANOVA demonstrated successful manipulation in both Study 1, $F(2, 248) = 29.07$, $p < .001$, and Study 2, $F(2, 215) = 21.22$, $p < .001$. Based on a post hoc test using Tukey–Kramer honestly significant difference (HSD) method, responses indicated the highest level of control over the audio component in the interactive music condition (Study 1: $M = 4.33$, standard error [SE] = .12; Study 2: $M = 4.45$, $SE = .25$), with significant mean difference above the static background music condition (Study 1: $M = 2.41$, $SE = 0.13$; Study 2: $M = 2.95$, $SE = 0.21$, $p < .001$) and the control condition (Study 1: $M = 2.85$, $SE = 0.14$; Study 2: $M = 2.09$, $SE = 0.27$, $p < .001$). In addition, one-way ANOVA also showed that the three conditions differed significantly from each other in their levels of perceived interactivity of the stimulus website for both Study 1, $F(2, 248) = 9.81$, $p < .001$ and Study 2, $F(2, 212) = 6.72$, $p < .001$. A post hoc test revealed the interactive music condition (Study 1: $M = 4.68$, $SE = 0.14$; Study 2: $M = 4.85$, $SE = 0.20$) led to the highest level of perceived interactivity, followed by the condition with static background music (Study 1: $M = 4.43$, $SE = 0.15$; Study 2: $M = 4.45$, $SE = 0.18$), and the control condition (Study 1: $M = 3.89$, $SE = 0.11$, $p < .001$; Study 2: $M = 3.96$, $SE = 0.20$, $p < .001$).

TABLE 7 Zero-order correlations among variables in Study 1 and Study 2

Study 1												
		1	2	3	4	5	6	7	8	9	10	11	12
1.	Condition	–											
2.	Consumer involvement	−.11	–										
3.	Experiential value	.24**	−.08	–									
4.	Cognitive value	−.00	−.03	.19**	–								
5.	Purchase intention	−.07	−.06	.25**	.06	–							
6.	The number of hours of internet use per day	−.06	−.03	.03	−.09	.04	–						
7.	Comfortability with navigating on the first visit to a website	−.09	.17**	−.12	−.08	−.08	−.05	–					
8.	Purposes of internet usage	−.09	.31**	−.03	.10	−.04	.06	.08	–				
9.	Music professional	−.00	−.01	−.14*	−.04	−.04	.11	−.00	−.10	–			
10.	Regular practice of musical instruments	.07	−.10	.01	−.07	−.07	.13*	.11	−.15*	.25**	–		
11.	Music listening frequency	.03	−.08	.10	.00	.13*	.39**	−.10	−.04	.19**	.08	–	
12.	Preference of music genres	.09	−.09	−.01	.10	.03	.10	−.07	.07	.15*	.18**	.36**	–
Study 2													
		1	2	3	4	5	6	7	8	9	10	11	12
1.	Condition	–											
2.	Consumer involvement	−.01	–										
3.	Experiential value	−.10	.41**	–									
4.	Cognitive value	−.05	.40**	.37**	–								
5.	Purchase intention	−.08	.18**	.48**	.26	–							
6.	The number of hours of Internet use per day	.01	.05	.17*	.14*	.22**	–						
7.	Comfortability with navigating on the first visit to a website	.03	.26**	.08	.14*	−.06	.06	–					
8.	Purposes of Internet Usage	−.09	.31**	−.03	.10	−.04	.06	.08	–				

TABLE 7 (Continued)

Study 2												
		1	2	3	4	5	6	7	8	9	10	11	12
9.	Music professional	.09	.07	.34**	.24**	.35**	.41**	−.12*	−.10	–			
10.	Regular practice of musical instruments	.06	.08	.17*	.17*	.21**	.22*	−.08	.49*	.25**	–		
11.	Music listening frequency	.05	.05	.30*	.22**	.30*	.62**	−.01	.56	.33**	.16	–	
12.	Preference of music genres	.04	.20**	.27**	.24**	.12*	−.03	.28**	.28**	.16*	.18*	.36**	–

Note: Condition: 1 = interactive music; 2 = static background music; 3 = control.
*$p < .05$.
**$p < .01$.

5.2 | The effects of interactive music on experiential value (H1)

One-way ANOVA demonstrated the significant difference of experiential value among the three conditions for both Study 1, $F(2, 248) = 7.60$, $p < .05$, and Study 2, $F(2, 212) = 5.86$, $p < .01$. A post hoc test using Tukey–Kramer HSD method indicated respondents perceived the highest level of experiential value in the interactive music condition (Study 1: $M = 4.63$, $SE = 0.16$; Study 2: $M = 5.92$, $SE = 0.16$), followed by the static background music condition (Study 1: $M = 4.13$, $SE = 0.18$; Study 2: $M = 4.90$, $SE = 0.20$), and the control condition (Study 1: $M = 3.73$, $SE = 0.10$, $p < .001$; Study 2: $M = 4.17$, $SE = 0.21$, $p < .001$).

GLM analysis revealed a significant two-way interaction effect between interactive music and consumer involvement on experiential value for both Study 1, $F(2, 248) = 4.14$, $p < .05$, $\eta^2 = 0.06$, and Study 2, $F(2, 212) = 8.14$, $p < .001$, $\eta^2 = 0.08$. As shown in Figure 3, in Study 1, under low consumer involvement, the interactive music condition yielded the highest experiential value, followed by the background music condition, and the control condition. However, the difference in experiential value among the three conditions diminished as the level of consumer involvement raised. In Study 2, under lower consumer involvement, interactive music as well produced greater experiential value than the other two conditions, while highly involved consumers perceived the lowest extent of experiential value.

The two-way interaction was further probed by the Johnson–Neyman technique. Data was dummy coded to compare the interactive music and the background music condition with the control condition respectively. The interaction between the interactive music condition and involvement was significant for both Study 1, $F(2, 248) = 5.67$, $p < .05$, $\eta^2 = 0.02$, and Study 2, $F(2, 212) = 6.30$, $p < .05$, $\eta^2 = 0.03$. Participants perceived greater experiential value under the interactive music condition than under the control condition if their involvement was less than 0.24 *SD* below the mean in Study 1. In Study 2, low-involvement participants (−2.18 *SD* below the mean) perceived significantly greater experiential value, whereas high-involvement participants (+0.60 *SD* above the mean) reported significantly lower experiential value. The experiential value of static background music was not significantly different from that of the control condition. Therefore, H2 was supported.

5.3 | The effects of interactive music on cognitive value (H2)

One-way ANOVA did not demonstrate a significant difference of cognitive value among the three conditions (Study 1: $F(2, 248) = 0.01$, p is not significant (*ns*); Study 2: $F(2, 212) = 1.17$, p is *ns*). However, with consumer involvement as a moderator, GLM analysis revealed a significant two-way interaction effect between interactive music and consumer involvement on elaboration for both Study 1, $F(2, 248) = 3.91$, $p < .05$, $\eta^2 = 0.04$, and Study 2, $F(2, 212) = 6.46$, $p < .01$, $\eta^2 = 0.06$. Figure 4 illustrates the interaction effect with consumer involvement on respondents' cognitive value. In both studies, interactive music generated the highest extent of cognitive value among high-involvement consumers and the lowest degree of elaboration among low-involvement participants.

The two-way interaction was again probed by the Johnson–Neyman technique, where data was dummy coded with the control condition as a baseline. The effect of interactive music was significantly moderated by consumer involvement in both Study 1, $F(2, 248) = 3.75$, $p < .05$, $\eta^2 = 0.01$ and Study 2, $F(2, 212) = 7.51$, $p < .01$, $\eta^2 = 0.03$. The interactive music condition generated significantly lower cognitive value than the control condition for low-involvement consumers whose involvement score was below the mean (−1.11 *SD* in Study 1 and −1.51 *SD* in Study 2). In contrast, the interaction between consumer involvement and

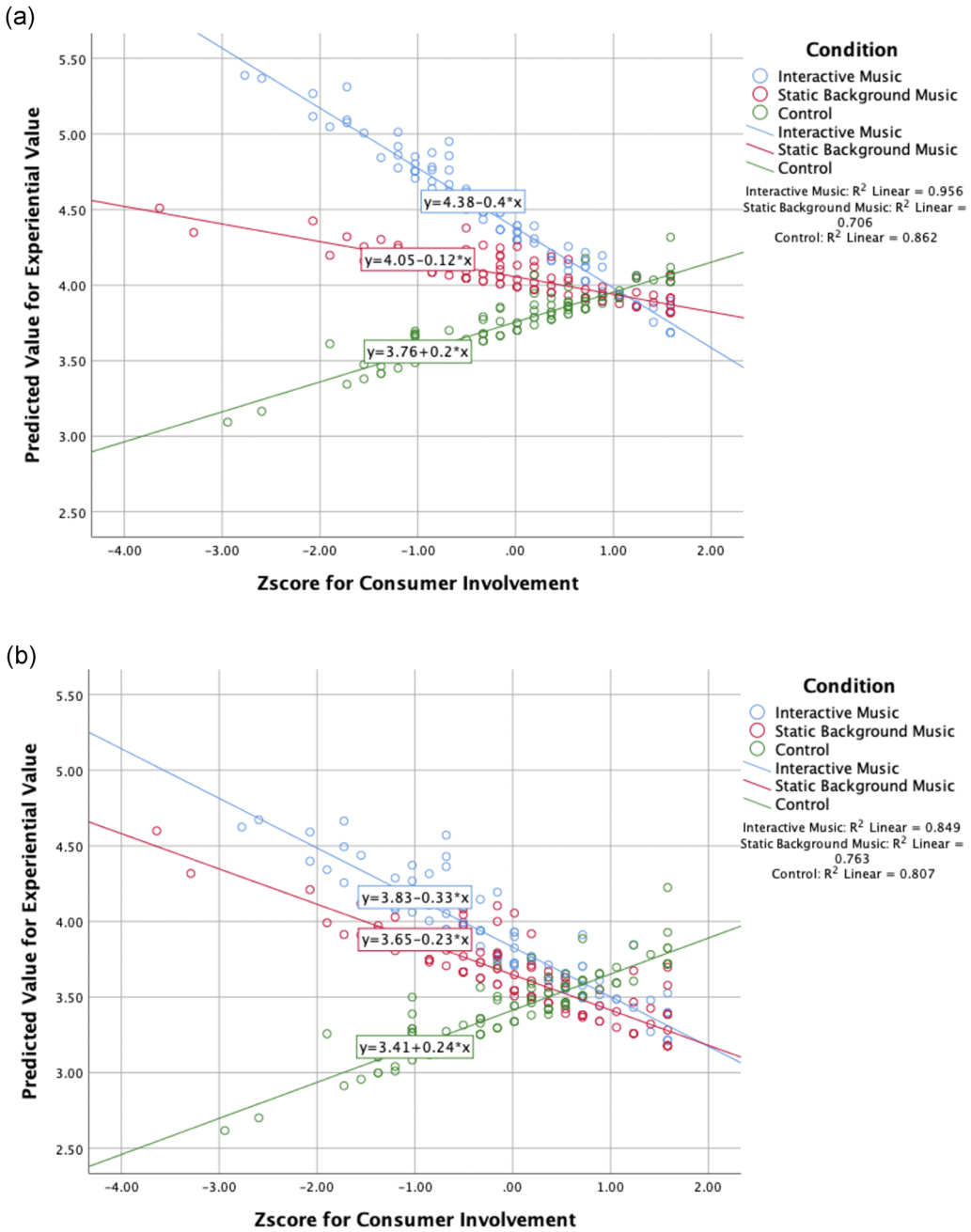

FIGURE 3 Interaction effect of interactive music and consumer involvement on experiential value. Blue lines refer to interactive music conditions. Red lines refer to static background music conditions. Green lines refer to the control conditions. (a) Interaction effect of interactive music and consumer involvement on the experiential value in Study 1. (b) Interaction effect of interactive music and consumer involvement on the experiential value in Study 2 [Color figure can be viewed at wileyonlinelibrary.com]

static background music showed the opposite pattern in Study 1, $F(2, 248) = 5.15$, $p < .05$, $\eta^2 = 0.02$. The static background music condition produced higher cognitive value than the control condition for low-involvement consumers whose involvement score was less than 1.40 standard deviation below the mean. While in Study 2, there is no significant interaction term between static background music and consumer involvement. Thus, H2 was supported.

5.4 | The effects of interactive music on purchase intention (RQ1, H3a, and H3b)

Based on a one-way ANOVA analysis, there was no significant difference in purchase intention across the three conditions (Study 1: $F(2, 248) = 0.52$, p is *ns*; Study 2: $F(2, 212) = 0.90$, p is *ns*). Nonetheless, GLM analysis demonstrated a significant two-way interaction effect of interactive music and consumer involvement on purchase

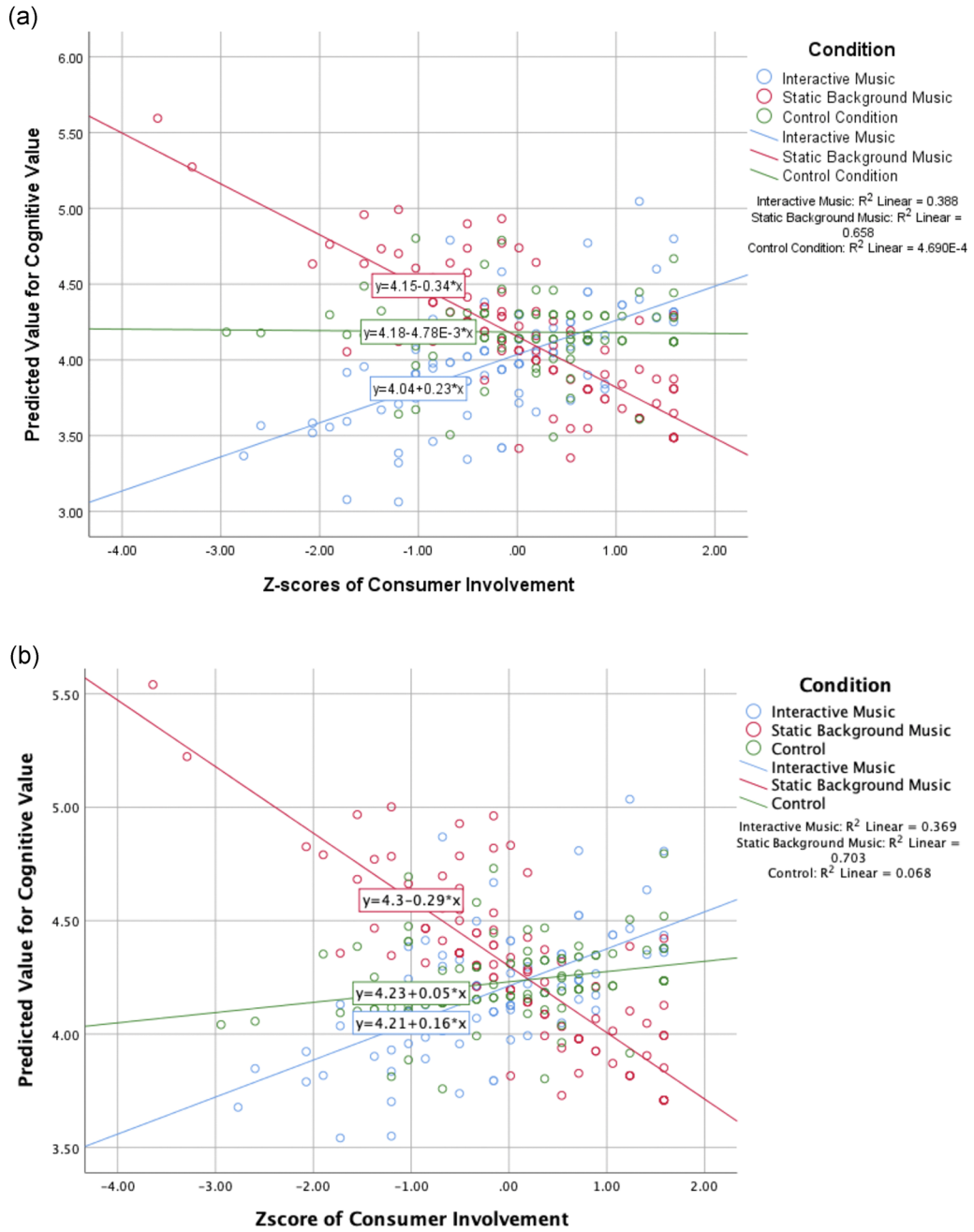

FIGURE 4 Interaction effect of interactive music and consumer involvement on cognitive value. Blue lines refer to interactive music conditions. Red lines refer to static background music conditions. Green lines refer to the control conditions. (a) Interaction effect of interactive music and consumer involvement on the cognitive value in Study 1. (b) Interaction effect of interactive music and consumer involvement on the cognitive value in Study 2 [Color figure can be viewed at wileyonlinelibrary.com]

intention in both Study 1, $F(2, 248) = 3.26$, $p < .05$, $\eta^2 = 0.04$, and Study 2, $F(2, 212) = 3.18$, $p < .05$, $\eta^2 = 0.03$. Under low consumer involvement, the control condition yielded the highest purchase intention, followed by the static background music condition, and the interactive music condition being the lowest. Conversely, as the level of consumer involvement increased, participants showed greater purchase intention under the interactive music condition than the static background music condition, and the control condition led to the lowest purchase intention of participants. Figure 5 illustrates the two-way interaction between interactive music and consumer involvement in purchase intention.

Model 1 of PROCESS macro and the Johnson–Neyman technique verified the significant two-way interaction between interactive music and consumer involvement in both Study 1, $F(2, 248) = 3.16$, $p < .05$, $\eta^2 = 0.01$, and Study 2, $F(2, 212) = 3.21$, $p < .05$, $\eta^2 = 0.02$. When the interactive music was compared with the control

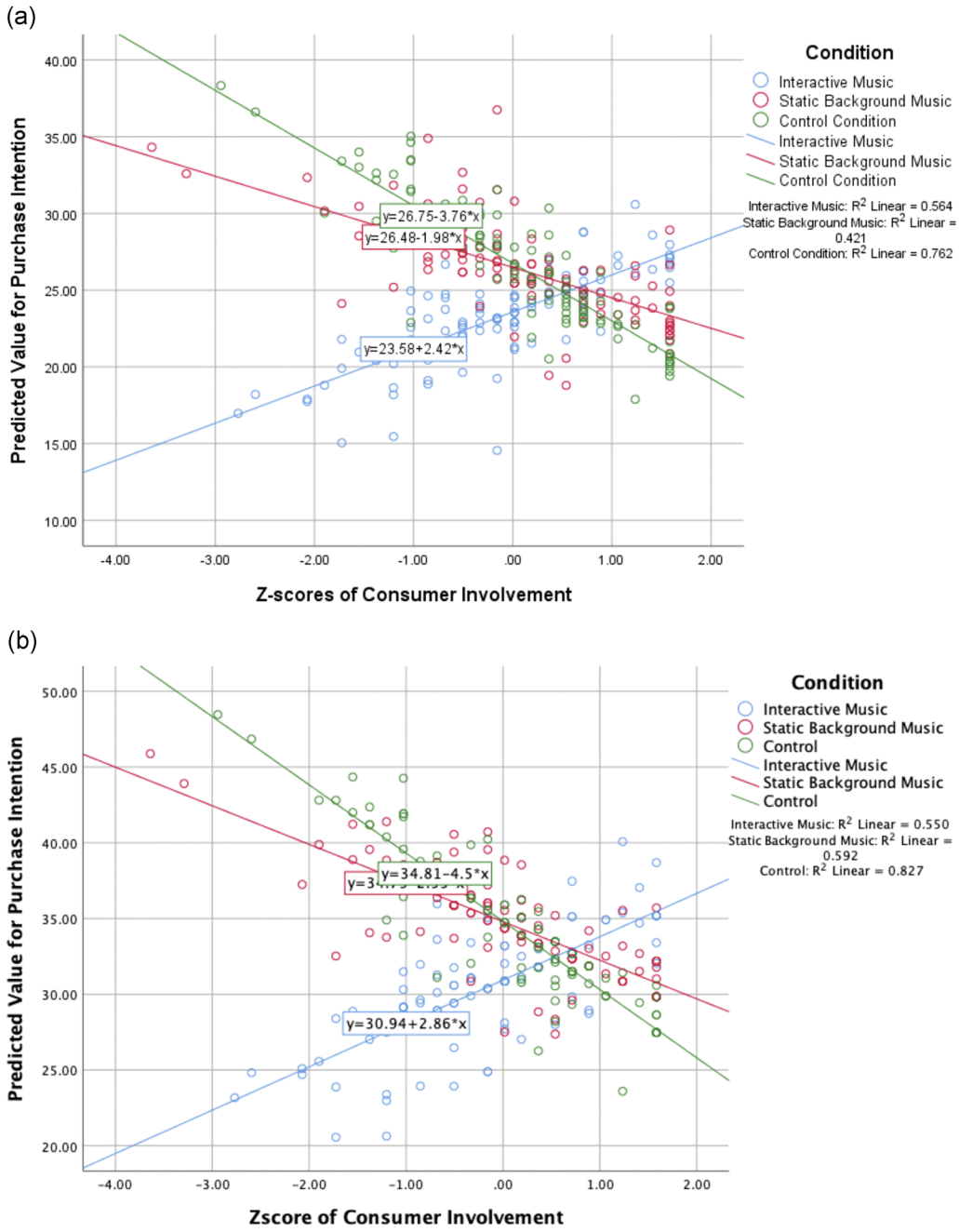

FIGURE 5 Interaction effect of interactive music and consumer involvement on purchase intention. Blue lines refer to interactive music conditions. Red lines refer to static background music conditions. Green lines refer to the control conditions. (a) Interaction effect of interactive music and consumer involvement on purchase intention in Study 1. (b) Interaction effect of interactive music and consumer involvement on purchase intention in Study 2 [Color figure can be viewed at wileyonlinelibrary.com]

condition, data showed a significantly reduced purchase intention when consumer involvement was below the mean (−0.70 *SD* in Study 1 and −0.46 *SD* in Study 2). The Johnson–Neyman technique did not reveal a statistically significant region when comparing the purchase intention of the static background music condition to that of the control condition.

Furthermore, we examine whether experiential and cognitive value would mediate the indirect effect of interactive music. Accordingly, we assessed the moderated mediation using Model 7 of PROCESS Macro, which examined the conditional indirect effects of interactive music on participants' purchase intention, depending on their level of consumer involvement in online shopping. In Study 1, purchase intention was significantly predicted by interactive music, cognitive value, and consumer involvement, $F(3, 248) = 11.13$, $p < .01$, $\eta^2 = 0.06$. The follow-up bootstrapped analysis again found consumers with lower involvement (M−1 *SD*) demonstrated reduced

purchase interest due to a lower level of perceived cognitive value, $B = -1.51$, $SE = 0.63$, 95% confidence interval (CI) from −2.84 to −0.36. However, data of Study 1 did not reveal significant moderated mediation of experiential value on purchase intention.

In Study 2, the indirect effect of interactive music on purchase intention was again found significantly mediated by cognitive value, $F(3, 248) = 27.29$, $p < .01$, $\eta^2 = 0.20$. Results of the bootstrapped analysis showed less involved consumers (M−1 *SD*) showed lower intent to purchase due to a lower level of cognitive value, $B = -0.24$, $SE = 0.18$, 95% CI from −0.63 to −0.07. On the other hand, experiential value, interactive music, and consumer involvement also significantly predict the degree of purchase intention, $F(3, 248) = 23.11$, $p < .01$, $\eta^2 = 0.18$. By contrast, the follow-up bootstrapped analysis found low-involvement consumers (M−1 *SD*) demonstrated a greater purchase intention, due to a heightened level of perceived experiential value, $B = 0.38$, $SE = 0.18$, 95% CI from 0.04 to 0.76. Therefore, H3a was partially supported while H3b was fully supported.

6 | SUMMARY

Findings suggest significant effects of interactive music on experiential value, cognitive value, and purchase at different levels of consumer involvement. For low-involvement consumers, interactive music enhanced the experiential value of online shopping compared with the control condition, leading to increased purchase intention in Study 2. Under the interactive music condition, as the level of consumer involvement increased, elaboration and purchase intention increased in general. In contrast, static background music significantly enhanced elaboration for low-involvement consumers. Data analysis also revealed the indirect effect of interactive music on purchase intention was significantly mediated by consumers' perceived cognitive value. Figure 6 summarizes the statistical model and research findings of the current study.

7 | DISCUSSION

Findings of the present study provide both theoretical and managerial implications for the use of SETs in an e-commerce environment. On one hand, interactive music can create a unique and favorable consumer experience by offering a substantial degree of experiential value; this positive impact of interactive music is more pronounced for low-involvement consumers. On the other hand, findings pertaining to the effect of interactive music on cognitive value also indicate areas that require additional attention when adopting novel technology in designing a virtual store. For lower involvement consumers, adding more features to control the sensory aspect of online shopping can be detrimental to their elaboration and purchase intention due to the cognitive load associated with such interaction. Based on the findings, the following discusses the contribution of theory and marketers along with limitations and avenues for future research.

7.1 | Contributions to theory

7.1.1 | The multifaceted role of interactivity

The current study suggests consumers nowadays are evaluating e-commerce channels, their brands, and products from a holistic view. Therefore, the impact of cognitive and experiential value may no longer influence a particular type of customer exclusively. Specifically, through interactive music significantly raises the experiential value of online shopping for low-involvement consumers, the cognitive burden associated with interactive music and its hindering effect on respondents' intent to compare information still leads to a lower degree of purchase intention. Moreover, findings show that cognitive value, rather than experiential value, significantly mediated purchase intention for both low- and high-involvement participants. Thus, the

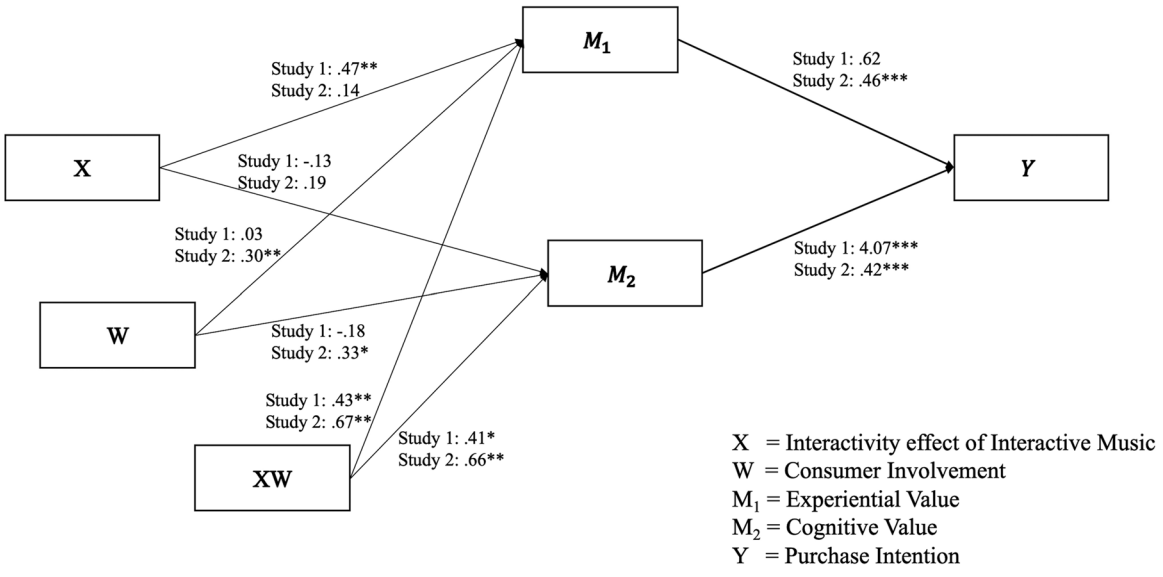

FIGURE 6 Summary of results. *$p < .05$, **$p < .01$, and ***$p < .001$

assumption that low-involvement shoppers are only subject to affective and atmospheric cues would oversimplify consumer psychology. This also implies that capturing causal or low-involvement shoppers is not as simple as eliciting a positive mood using interactive music.

While retailing in the digital space has arrived at a mature state, consumers in the market have also become sophisticated enough where everyone can engage in more or less brand-related and inferential thinking. Despite the significant effect of interactive music on consumers' perceived experiential value, both Studies 1 and 2 suggest the pattern of purchase intention is more predictable by the cognitive value offered by the online store. This indicates that consumers nowadays are more engaged in critical, active thinking throughout their shopping experience, and even when exposed to such a highly sensory stimulated e-commerce environment, they still rely more heavily on cognitive resources to make rational purchase decisions.

Altogether, our findings imply the multifaceted role of SETs in the digital marketplace. Interactive on-screen affordance can offer fun and coolness perceptions for low-involvement consumers as well as cognitive appeals to high-involvement consumers. Moreover, the findings also indicate that involvement in different product types should be taken into account when SETs are embedded in retailing website design. While multisensory appeals can promote consumers' positive sentiment when they shop for common, routine products, interactive techniques also have the potential to facilitate more complex, high-risk purchase decision-making for heavily engaged e-consumers. Therefore, an avenue for future research is to examine the effect of interactive music and other types of SETs with various product types.

7.1.2 | The effect of interactive music on low-involvement consumers

The positive effects on experiential value and the negative effects on cognitive value of interactive music on low-involvement consumers suggest that the use of interactive music can generate memorable, unexpected shopping experience through a heightened degree of novelty but may cause cognitive burden to these less involved consumers. Results suggest that it is not the sheer presence of music that interferes with low-involvement consumers' elaboration; while the interactive music condition yielded significantly lower elaboration among low-involvement subjects, the static background music led to *higher* cognitive value for them compared with the control condition. Furthermore, the lower degree of perceived cognitive value is detrimental to the purchase intention of low-involvement consumers. These results indicate that though musical stimuli can increase consumers' immersion in the shopping task through a flow effect (Koufaris, 2002), adding greater user control over the background music overloads the limited mental resource that low-involvement consumers allocate for online shopping tasks (Richard & Chebat, 2016). Therefore, on the one hand, offering low-involvement consumers sufficient cognitive resources to facilitate their decision-making processes becomes particularly crucial. On the other hand, considering that low-involvement consumers responded very positively about the use of interactive music in terms of its experiential value, incorporating interactive features to construct emotional brand or communication campaigns would likely build positive sentiments among low-involvement consumers.

7.1.3 | The effect of interactive music on high-involvement consumers

The current study demonstrated that involvement is a positive predictor of elaboration and purchase intention under the interactive music condition, but not under the other two conditions. These results suggest that higher involvement consumers are more adept at taking advantage of SET applications. With an adequate amount of cognitive capacity based on the previous shopping experience and high motivation, they can combat the cognitive burden that interactive music may incidentally carry (Xu & Sundar, 2016). The effects of interactive music compared with the control condition on high-involvement consumers' responses may have been subdued not only by the fact that they are less responsive to peripheral cues in general (Petty & Cacioppo, 1984), but also the hedonic nature of interactive music. For serious shoppers who may typically go through a more complicated decision-making process while shopping online (Sharma et al., 2010), interacting with an atmospheric factor may not be considered as a primary task. Nevertheless, we observed increases in cognitive value and purchase intention only under the interactive music condition as consumer involvement increases. This implies that greater user control over sensory experience can enhance marketing outcomes for those who are already motivated to invest cognitive resources to evaluate the products and the brand.

7.2 | Implications for marketers

There are clear implications of these results for marketers, who are advised to use online consumer involvement for segmentation, target marketing, and product positioning. The downside of interactive music effects on low-involvement consumers can be mitigated through various approaches for marketers. First, as the cognitive burden is identified as an obstacle to casual shoppers, an implication is to provide purchase decision aids for low-involvement customers, such as well-designed navigational tools. Second, an effective interface design should strike a balance between multimodal stimuli. In the present study, both pieces of music generated a moderate extent of arousal, according to theories and former literature (Schwartz et al., 2017). To avoid cognitive overload when adopting interactive music in e-commerce, future marketers can consider utilizing lower-arousal audio stimuli, such as background music with a tempo of 72–90 beats per minute. In addition, while we experiment with soundtrack layering effects, there are various other formats of interactive music that can be applied to digital merchandising design, and some of the less cognitively demanding options can be more appropriate

alternatives when it comes to targeting low-involvement consumers. By adopting these strategies, the drawback of interactive music on low-involvement consumers can be compensated, leading to the more effective application of multisensory SETs to promote consumer behavior.

From a managerial standpoint, it is critical to provide adequate cognitive value to satisfy high-involvement consumers. In the context of adopting interactive music in e-commerce, though music did not directly offer greater product information to assist consumers in complex decision-making, audio stimulus, such as melodies, rhythms, and beats can generate effective inferential cues (Burkhalter & Thornton, 2014). For instance, by systematically associating a piece of layered soundtrack with a certain collection of products, high-involvement consumers may soon establish a mental connection. Thus, they may relate to certain product information every time when the interactive piece of audio is triggered and presented, thereby reinforcing their ability to recognize and recall the products and the brand.

7.3 | Limitations and future research

The complex nature of high-involvement consumer behavior suggests a promising direction for future studies, as additional variables need to be considered concurrently to explore the effect of interactive music on this group of customers. To specify, the relationship between interactivity and their experiential and cognitive value as well as purchase intention can be further probed by including other antecedents of consumer behavior (e.g., purchase frequency, shopping volume, price sensitivity), product- and brand-related factors (e.g., product quality, brand reputation), or external influences (e.g., e-word of mouth, advertisements) in the current model. In particular, to investigate how interactive music impacts the cognitive and experiential value of high-involvement customers respectively, future research can layer the discussion on the concept of shopping orientations. While former studies have widely confirmed the distinct behavioral traits of experiential and functional shoppers (e.g., Chen & Hung, 2015; Chiu et al., 2014), interactive music is likewise expected to elicit different responses from those who shop with clear goals and those who shop for fun and experience.

Another limitation is that the current research did not address mobile shopping contexts. Future studies may reveal additional findings by instructing test subjects to participate in using their mobile devices. In particular, users typically interact with mobile devices with touchscreens, and literature has addressed the effect of touch gestures on digital engagement (e.g., Shi & Kalyanam, 2018). This fundamental difference in HCI may have a dominating effect on how consumers engage their sensory channels in mobile settings. Hence, future research can explore the effect of interactive music for mobile shoppers as well.

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How to cite this article: Hwang AH-C, Oh J, Scheinbaum AC. Interactive music for multisensory e-commerce: The moderating role of online consumer involvement in experiential value, cognitive value, and purchase intention. *Psychology & Marketing*. 2020;1–26. https://doi.org/10.1002/mar.21338